Department of Environmental Conservation

Division of Environmental Remediation

Environmental Restoration
Record of Decision
Qual Krom Site
City of Poughkeepsie, Dutchess County
Site Number B-00036-6

March 1999

New York State Department of Environmental Conservation
GEORGE E. PATAKI, *Governor* JOHN P. CAHILL, *Commissioner*

DECLARATION STATEMENT
ENVIRONMENTAL RESTORATION RECORD OF DECISION

Qual Krom Environmental Restoration Site
City of Poughkeepsie, Dutchess County
Site No. B-00036-3

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedial action for the Qual Krom Environmental Restoration Site which was chosen in accordance with the New York State Environmental Conservation Law (ECL).

This decision is based upon the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the Qual Krom Environmental Restoration Site and upon public input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A bibliography of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened release of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, presents a current or potential threat to public health and the environment.

Description of Selected Remedy

Based upon the results of the Site Investigation/Remedial Alternatives Report (SI/RAR) for the Qual Krom Site and the criteria identified for evaluation of alternatives, the NYSDEC has selected excavation of metals contaminated soils above NYSDEC soil cleanup objectives. The components of the remedy are as follows:

- Asbestos abatement will be conducted in the structure, salvageable materials will be separated from the structures for recycling, and the building will be demolished.

- Removal of soils with contaminant levels above TAGM #4046 soil cleanup objectives To accomplish complete removal, approximately one to two feet of soil east of the existing building will be removed in addition to approximately twelve feet of soil under the eastern half of the existing building. Approximately 1,250 tons of soil will be removed from the site.

- Delineation sampling with a grid system across the site at various depth intervals will be conducted to define the limits of excavation.

- Disposal of all excavated material and demolition wastes at appropriately permitted landfills.

- Site restoration by rough grading, backfilling, top soiling and seeding.

New York State Department of Health Acceptance

The New York State Department of Health concurs with the remedy selected for this site as being protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective.

_____ _____

Date

Michael J. O'Toole, Jr., Director
Division of Environmental Remediation

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SECTION 1: SUMMARY OF THE RECORD OF DECISION

The New York State Department of Environmental Conservation (NYSDEC) in consultation with the New York State Department of Health (NYSDOH) has selected a remedy to address the threat to human health and/or the environment created by the presence of hazardous substances at the Qual Krom Brownfield Site.

The 1996 Clean Water / Clean Air Bond Act provides funding to municipalities for the investigation and cleanup of brownfields. Brownfields are abandoned, idled or under-used properties where redevelopment is complicated by real or perceived environmental contamination. They typically are former industrial or commercial properties where operations may have resulted in environmental contamination. Brownfields often pose not only environmental, but legal and financial burdens on communities. Under the Environmental Restoration (Brownfields) Program, the State provides grants to municipalities to reimburse up to 75 percent of eligible costs for site investigation and remediation activities. Once remediated, the property can then be reused.

Improper discharges to sumps, floor drains and soils have resulted in the disposal of a number of hazardous substances, including the heavy metals; arsenic, cadmium, chromium, hexavalent chromium, lead, mercury and selenium, at the site. These disposal activities, which are more fully described in Sections 3 and 4 of this document, have resulted in the following threats to the public health and/or the environment:

- A threat to human health associated with contaminated soils beneath the building and exposure to, ingestion of, or contact with surficial soils at the rear of the property.

- An environmental threat associated with the impacts of contaminants to soil, exposure to birds and small animals on-site, and potentially groundwater.

In order to eliminate or mitigate the threats to the public health and/or the environment that the hazardous substances disposed at the Qual Krom Brownfield Site have caused, the following remedy was selected to allow for residential use of the site:

- Complete removal of soils with contaminant levels above TAGM #4046 soil cleanup objectives or site background. To accomplish complete removal, the building will be demolished and approximately one to two feet of soil east of the existing building and soil to a depth of approximately twelve feet under the eastern half of the existing building would be excavated for off-site disposal. The site will then be backfilled, and topsoiled and seeded. Approximately 1,250 tons of soil will be removed from the site and properly disposed at an approved landfill.

The selected remedy, discussed in detail in Section 7 of this document, is intended to attain the remediation goals selected for this site in Section 6 of this Record of Decision (ROD) in conformity with applicable standards, criteria, and guidance (SCGs).

SECTION 2: SITE LOCATION AND DESCRIPTION

The Qual Krom Brownfield Site # B00036-3, is the former location of a chrome electroplating facility. It is located about 0.1 mile from Rt. 9G at 28 Orchard Place in the City of Poughkeepsie, Dutchess County (Figure 1). The 0.20 acre wedge shape property is in an urban residential neighborhood and bordered by a railroad grade to the south and a private residence to the north (Figure 2).

SECTION 3: SITE HISTORY

The Qual Krom Site was used as a commercial metal electroplating operation until 1987. The property was seized by the City of Poughkeepsie in 1988 for back taxes without knowledge of the existing conditions. Around 1990, there was a fire which damaged a portion of the building. Following the fire, the City of Poughkeepsie Building Inspector declared the building unsafe and sealed the building. On or about January 13, 1996, a portion of the roof of the Qual Krom building collapsed under the weight of a significant snowfall.

3.1: Operational/Disposal History

Based on observations of the interior of the building, the eastern portion of the building was the primary area used for plating. It is surmised that materials to be plated were dipped into large plating vats and then hung to drip dry. Chemical cleaning and grinding may have also occurred in this area. Two drainage channels in the floor run the length of the building from north to south and empty into sumps at the southern end of the building. Holes were punched through the concrete in the bottoms of these sumps. It is presumed that metals contaminated liquids were introduced to subsurface soils through the holes in the sumps as well as small cracks in the concrete floor. Since the fill material under the slab is more permeable than the native till, the metals contaminated liquid likely pooled under the slab and slowly seeped downwards toward the groundwater table. In addition, rainwater may have become perched in the fill above the native till and acted as a mechanism for transport of metals under the slab.

It has been reported that during operation of the Qual Krom facility, fans located on the east side of the building were observed blowing dust out of the building and into the air. This dust may have contained chromium and other heavy metals that settled out on the surface of the eastern portion of the property and the neighboring property at 34 Orchard Place.

Drums containing metals wastes were stored outside along the east side of the building, which may have leaked or spilled, contributing to the soil contamination.

3.2: Environmental Restoration History

Previous Investigations

NYSDEC Investigation

In July 1989, the NYSDEC initiated an investigation of the Qual Krom facility. The NYSDEC concluded that waste contained in the drums stored outside of the building was corrosive and contained elevated levels of metals, particularly chromium, cadmium, and lead. Therefore, the material was classified as hazardous waste and disposed as part of an Interim Remedial Measure (IRM) conducted by the City. See Section 4.2.

Preliminary Site Assessment

Under directive of the NYSDEC, the City of Poughkeepsie (City) retained an environmental consultant to conduct a Preliminary Site Assessment (PSA) to investigate soil and building impacts and to complete IRMs, as warranted, at the Qual Krom Site.

In January 1996, a portion the roof of the Qual Krom building collapsed. This created an exposure pathway for hazardous materials creating a possible emergency situation. After conducting a site inspection, the NYSDEC enlisted the help of the US Environmental Protection Agency (EPA) Emergency Response Team, who inspected the site in February 1996. The EPA's Emergency Response Team removed sections of the building that had collapsed or were in danger of collapsing, isolated the exposed hazardous waste, cleaned and sampled the concrete floor, and completed most of the interim remedial measures (IRMs) that have been conducted at the site. The IRMs are discussed in Section 4.2.

The remaining PSA field tasks were conducted between May and July 1996. These tasks included a magnetometer investigation, test pitting to characterize magnetic anomalies found behind the building, test pitting to characterize soils beneath and around a former drum storage area, sampling of soil and water in sumps and floor drains, and wipe sampling of the concrete floor. It was not possible to perform dye testing on the floor drains and sewer lines at the facility because they were completely clogged with debris. The findings of the PSA investigation are summarized below.

The magnetometer survey indicated one large magnetic anomaly on the east side of the Qual Krom building, about 50 feet from the building, in the approximate center of the back of the lot. Subsequent test pitting revealed that the source of the anomaly was a large piece of iron slag. No drums, tanks or pipes were found in this area of the site.

Test pits were excavated in the eastern portion of the property behind the site building, as shown in Figure 2. Analysis of samples collected from the upper one to two feet of soil in the test pits detected concentrations of arsenic, cadmium, chromium, lead, mercury, and selenium at levels exceeding the soil cleanup objectives in TAGM #4046. Arsenic detected at 13.4 ppm in TP-04 exceeded the guidance value of 7.5 ppm. Chromium detected at 87 ppm and 70 ppm in TP-03 and TP-05 respectively, exceeded the guidance value of 50 ppm. Mercury detected in TP-01 (0.7 ppm), TP-03 (0.71 ppm), TP-04 (2.3 ppm) and TP-05 (2.6 ppm) exceeded the guidance value of 0.1 ppm. Selenium detected in TP-01 (4.6 ppm), TP-03 (5.2 ppm), TP-04 (4.6 ppm) and TP-05 (4.3 ppm) exceeded the guidance value of 2.0 ppm.

Small amounts of blue-green crystalline material were observed at or above the boundary between the fill material and the native till in the vicinity of the former drum storage area. Laboratory results indicate that this crystalline substance contained the heavy metals arsenic, cadmium, chromium, mercury, lead, and selenium at levels which exceed NYSDEC soil cleanup objectives.

Subsurface materials on the property consist of one to two feet of loose fill material overlying glacial till deposits. This fill is composed primarily of foundry sand with variable amounts of ash, brick, slag, and roots. Miscellaneous metal objects were also observed in the fill.

A soil/sediment sample was collected from a hole in the bottom of the sump located inside the southeast corner of the site building. Analysis of this sample detected concentrations of arsenic (75.7 ppm), chromium (52,200 ppm), lead (1,190 ppm), and silver (3.3 ppm) at concentrations above the soil cleanup objectives found in TAGM #4046. The soil cleanup guidance values are 7.5 ppm for arsenic, 50 ppm for chromium, and 500 ppm for lead. No soil cleanup objective is defined for silver.

Laboratory results of a water sample taken from another sump located inside the south portion of the building indicated high levels of metal wastes including cadmium (62.8 ppb), chromium (35,000 ppb) and lead (122 ppb). This contaminated water apparently rises up through the bottom of the sump during periods of heavy precipitation, suggesting that the soils beneath the sump become saturated after rain and are impacted by hazardous wastes. The water quality standards are 5 ppb for cadmium, 50 ppb for chromium and 25 ppb for lead.

Wipe samples taken from the concrete floor in the vicinity of the former plating vats indicated chromium levels of up to 1,100 ppm. No cleanup objective is defined for wipe samples.

Asbestos and Lead-Based Paint Survey

Sampling for asbestos and lead-based paint was performed in June 1996 by Accu-Labs, Inc., of Waterford, New York. Asbestos-containing materials were identified in floor tiles in the southern portion of the building, and in tar surfaces and flashing material in the upper roofing layer. Lead-based paint was found on the outside of the building on siding, window frames, wood beams, and roofing materials.

SECTION 4: CURRENT STATUS

To determine the nature and extent of any contamination by hazardous substances of this Environmental Restoration site, the City of Poughkeepsie has recently completed a Site Investigation/Remedial Action Report (SI/RAR).

4.1: Summary of the Site Investigation

The purpose of the SI was to define the nature and extent of any contamination resulting from previous activities at the site.

The SI was conducted between June 1998 and September 1998. A report entitled Site Investigation / Remedial Alternatives, Qual Krom Site, January 1999, has been prepared that describes the field activities and findings of the SI in detail.

The SI included the following activities:

- Installation of three bedrock and four overburden monitoring wells to characterize groundwater quality and hydrogeologic conditions. See Figure 3.

- Advancement of eight soil borings beneath the building's concrete slab to characterize soil contamination. Soil samples were obtained from two foot intervals in each boring to determine impacts to soils and to analyze the physical properties of the soil.

To determine which media (soil, groundwater, etc.) contain contamination at levels of concern, the SI analytical data was compared to environmental Standards, Criteria, and Guidance values (SCGs). Groundwater and drinking water SCGs identified for the Qual Krom Site are based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part V of NYS Sanitary Code. For soils, NYSDEC TAGM #4046 provides soil cleanup objectives for the protection of groundwater, background conditions and health-based exposure scenarios.

Based on the Site Investigation results in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized below. More complete information can be found in the SI Report.

Chemical concentrations are reported in parts per billion (ppb) and parts per million (ppm). For comparison purposes, where applicable, SCGs are provided for each medium.

4.1.1 Nature of Contamination:

As described in the SI Report, many soil and groundwater samples were collected at the Site to characterize the nature and extent of contamination. The sampling locations are designated in Figures 2 and 3. The contaminants found at the site are primarily inorganics; arsenic, cadmium, chromium, hexavalent chromium, lead, mercury and selenium.

4.1.2 Extent of Contamination

Table 1 and Figure 4 summarize the extent of contamination for the contaminants of concern in on-site soils and compares the data with the proposed remedial action levels (SCGs) for the Site. The following are the media which were investigated and a summary of the findings of the investigation.

Soil

Analysis of soil samples collected from beneath the building slab during the SI (SB-01 through SB-05 and SB-14 through SB-16) ranging from depths just below the concrete slab to eleven feet below the slab detected concentrations of arsenic, chromium, and mercury at levels exceeding the soil cleanup guidance values found in TAGM #4046.

Arsenic detected at 16 ppm, 32 ppm, 8.3 ppm, 7.7 ppm in SB-01 at depths of 0–3 feet, 3–5 feet, 5-7 feet and 9-11 respectively, exceeded the guidance value of 7.5 ppm.

Chromium detected in SB-01 (180 ppm), SB-02 (2,900 ppm), SB-14 (1,020 ppm) and SB-15 (129 ppm) just below the slab exceeded the guidance value of 50 ppm. As the borings beneath the slab were extended and samples collected at their final depths, chromium was detected at final depths of 8–13 feet in SB-01 (100 ppm), SB-02 (200 ppm) and SB-14 (129 ppm).

Mercury detected in SB-01 (1.0 ppm) and SB-15 (0.791 ppm) exceeded the 0.1 ppm guidance value.

Groundwater

Groundwater flows east-northeast. Analysis of water samples collected from the overburden and bedrock monitoring wells indicated low concentrations of those metals found in the soil samples discussed above. Lead was detected at 26.1 ppb in MW-02, only marginally exceeding the groundwater standard of 25 ppb. Manganese was detected at 843 ppb, 582 ppb, and 849 ppb in MW-01, MW-01R and MW-02, exceeding the standard of 500 ppb. Iron and sodium were also detected at levels well above the standards in most of the groundwater samples collected. The concentrations of iron, manganese and sodium detected in the monitoring wells are consistent with concentrations commonly found in regional groundwater and are consistent with background.

4.2 Interim Remedial Measures:

Interim Remedial Measures (IRMs) are conducted at sites when a source of contamination or an exposure pathway can be effectively addressed before completion of the SI/RAR.

In August 1992, 15 drums containing hazardous wastes containing high concentrations of chromium, cadmium and lead were removed from the site by the City.

In 1996, the EPA implemented another Interim Remedial Measure for the site. This IRM included removal of hazardous materials contained in remnant vats; removal of concrete plating vats; removal of drums containing hazardous wastes; and over packing structurally unsound drums. The floors, floor drains, and catch basins were also pressure washed and the sediments and contaminated soil in the sumps were removed. Materials generated during this IRM were disposed of off-site.

Surface soils and the subsurface basement of the adjacent home (34 Orchard Place) showed evidence of impacts resulting from previous operations and migration of contaminants from the Qual Krom Site. After reviewing preliminary data and inspecting the adjacent property, the NYSDEC directed the City of Poughkeepsie, in September 1998, to implement an IRM to address the impacts from the runoff from the Qual Krom Site to the adjacent property. The IRM cost approximately $80,250 and included the following tasks:

- Removal of approximately one foot of surface soils from the entire backyard of 34 Orchard Place and replacement with clean topsoil and sod.

- Removal of the asphalt driveway to allow for excavation along the basement wall and replacement of the driveway with 9 inches of compacted base and 3 inches of asphalt.

- Installation of a barrier system along the full length of the south basement wall. This consisted of a trench approximately five feet deep lined with a 30 mil HDPE liner.

- Removal of impacted concrete along the south basement wall interior and repoint and seal the basement wall interior.

4.3 Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the health risks can be found in Section 6 of the SI Report.

An exposure pathway is how an individual may come into contact with a contaminant. The five elements of an exposure pathway are 1) the source of contamination; 2) the environmental media and transport mechanisms; 3) the point of exposure; 4) the route of exposure; and 5) the receptor population. These elements of an exposure pathway may be based on past, present, or future events.

Pathways which are known to or may exist at the site include:

- Presently, no groundwater contamination has been detected at the site or migrating from the site. The existing building acts as a cover and limits the infiltration of rainwater and the subsequent migration of contaminants. Demolition of the building without further remediation would alter this situation. However, area residences are supplied with public water and no supply wells are documented in the area. Therefore, ingestion of groundwater is unlikely.

- The site is in a densely populated residential area. Trespassing was a common occurrence prior to the recent construction of a fence to restrict site access. Restriction of site access should mitigate disruption of the site and prevent dermal exposure and inhalation of metals contaminated particulate.

- Some asbestos containing material (ACM) is located inside the building. Some of the building is unstable and a collapse would release asbestos to the environment and expose the public via inhalation of asbestos fibers.

4.4 Summary of Environmental Exposure Pathways:

This section summarizes the types of environmental exposures which may be presented by the site.

Since the completion of the IRM at the adjacent property, contamination associated with the site is restricted to the 0.2 acre site. Most of the on-site contamination is confined to soils and the dilapidated structure. A fence has been constructed around the site. Fauna exposure would be limited to birds and small animals.

No off-site surface water or groundwater has been impacted to date. However, runoff from the site was responsible for the impacts to the adjacent residence and site runoff has been witnessed flowing along the street to the storm sewer. The area is serviced by a combined sewer system.

SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past owners and operators, waste generators, and haulers.

The Potentially Responsible Party for the site, documented to date, is George Fluegel, the former owner and operator of the Qual Krom facility.

The PRPs are subject to legal actions by the State for recovery of all response costs the State has incurred. The City of Poughkeepsie will assist the State in their efforts by providing all information to the State which identifies PRPs. The City also will not enter into any agreement regarding response costs without the approval of the NYSDEC.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS AND FUTURE USE OF THE SITE

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10, which includes the goal of achieving predisposal conditions to the extent feasible and authorized by law. The overall remedial goal is to meet all standards, criteria and guidance (SCGs) and be protective of human health and the environment. At a minimum, the remedy selected should eliminate or mitigate all significant threats to the public health and to the environment presented by the hazardous substances disposed at the site through the proper application of scientific and engineering principles.

The proposed future use for the Qual Krom Site will be residential. The goals selected for this site are:

- Reduce, control, or eliminate to the extent practicable the contamination present within the soils on-site.

- Provide for attainment of SCGs in soils at the limits of the area of concern, to the extent practicable.

- Eliminate the potential for direct human or animal contact with the contaminated soils on site.

- Prevent, to the extent possible, future migration of contaminants in the soils to groundwater.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy should be protective of human health and the environment, be cost effective and comply with other statutory requirements. Potential remedial alternatives for the Qual Krom Site were identified, screened and evaluated in a Remedial Alternatives Report. This evaluation is presented in the report entitled Site Investigation / Remedial Alternatives, Qual Krom Site, January 1999.

A summary of the detailed analysis of the alternatives follows. As presented below, the "Time to Implement" reflects only the time required to implement the remedy, and does not include the time required to design the remedy or procure contracts for design and construction.

7.1: Description of Alternatives

The potential remedies are intended to address the contaminated soils at the site.

With the exception of the No Further Action Alternative (Alternative 1), building demolition and asbestos abatement are baseline costs regardless of the remedial option selected for this site. It is anticipated that the asbestos abatement and building demolition will cost approximately $125,000. Asbestos abatement and demolition costs are included in the cost estimates for Alternatives 2, 3, and 4. Actual costs to demolish the buildings may vary substantially depending upon how much reusable material remains in the buildings.

Alternatives 1, 2, and 3 would require that a notification be placed in the deed to warn future owners of the potential for exposures during future intrusive site work. Alternative 4 would not require a deed notification.

Alternative 1 - No Further Action

Present Worth:	$ 0
Capital Cost:	$ 0
Annual O&M:	$ 0
Time to Implement	None

This alternative would recognize remediation of the site conducted under previously completed IRMs. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Alternative 2 - Multimedia Asphalt Cap

Present Worth:	$ 254,000
Capital Cost:	$ 227,000
Annual O&M:	$ 6,000
Time to Implement	6 Months

This alternative would incorporate removal of approximately one to two feet of the impacted soil east of the building. Elsewhere throughout the site, a minimum of one foot of soil would be removed to allow for installation of an impermeable liner, a drainage layer, and an asphalt cap without increasing the existing surface elevation of the property. The asphalt cap in the area of impacted soil under the eastern half of the existing building would be underlain by a high permeability drainage layer and a low permeability liner. The liner and drainage layer would direct runoff to the City's combined storm/sanitary sewer and prevent rainwater infiltration that could cause migration of metals through the soils into groundwater. Approximately 750 tons of soil would be removed from the site to implement this alternative.

Groundwater monitoring would be conducted annually for a period of up to five years. Monitoring would be proposed for the shallow groundwater wells downgradient of the impacted soil area. Samples would be analyzed for target metals. If monitoring showed no impact to groundwater after 3 years, the monitoring would be discontinued.

Alternative 3 - Limited Excavation With Cover

Present Worth:	$ 215,000
Capital Cost:	$ 208,000
Annual O&M:	$ 1,500
Time to Implement	6 Months

This alternative incorporates partial removal of impacted soil followed by installation of asphalt paving to create a barrier to direct human contact with the remaining contaminated soils. This partial removal would include removing the upper foot of soil on the property east of the existing building, in addition to the upper two to three feet of significantly impacted soil under the eastern half of the building. Significantly impacted soils are defined as having concentrations greater than ten times the current TAGM #4046 objectives. Approximately 550 tons of impacted soils, which were generally noted during this investigation as visibly stained, would be excavated and removed from the site under this alternative. Confirmatory samples would be collected to verify removal of significantly impacted soils.

Groundwater monitoring would occur annually for two years to assure the remedy did not result in any groundwater impacts. The monitoring would be of the shallow groundwater wells downgradient of the impacted soil area. Samples would be analyzed for target metals.

Alternative 4 - Complete Removal of Contaminated Soils With Backfill

Present Worth:	$ 262,000
Capital Cost:	$ 262,000
Annual O&M:	$ 0
Time to Implement	6 Months

This alternative would incorporate complete removal of soils with contaminant levels above TAGM #4046 soil cleanup objectives. To accomplish complete removal, approximately one to two feet of soil east of the existing building would be required to be removed in addition to soil to a depth of approximately twelve feet under the eastern half of the existing building. Approximately 1,250 tons of soil would be removed from the site to implement this alternative.

In order to verify complete removal of soils with contaminant levels above TAGM #4046 soil cleanup objectives, delineation sampling would be required. Prior to excavation, a grid would be established and soil

samples would be collected at various intervals based on previous investigations. Samples would be collected and sent to a CLP laboratory for metals analysis to define the extent of contamination.

Following complete removal of soils with contaminant levels above TAGM #4046 soil cleanup objectives and disposal at an appropriate landfill, the site would be backfilled and rough graded to achieve acceptable grades. The site would then be topsoiled and seeded.

7.2 Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of environmental restoration project sites in New York State (6 NYCRR Part 375). For each of the criteria, a brief description is provided followed by an evaluation of the alternatives against that criterion. A detailed discussion of the evaluation criteria and comparative analysis is included in the Remedial Alternatives Report.

The first two evaluation criteria are termed threshold criteria and must be satisfied in order for an alternative to be considered for selection.

1. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance.

Groundwater at the site currently meets the groundwater quality standards published in 6 NYCRR, Part 700 - 706. Presently, the building acts as a cap preventing infiltration of runoff through the contaminated soil and subsequently impacting the groundwater. Future disruption of site conditions may result in groundwater impacts.

Alternative 1 would leave the site as is and the contamination in place. This no further action alternative would therefore not comply with SCGs as defined in TAGM #4046.

By capping the site under Alternative 2, the groundwater would be protected from impact from contaminated soils above the groundwater table. However, capping the impacted soils beneath the eastern half of the existing building would not comply with TAGM #4046.

The limited excavation proposed for Alternative 3 would leave contaminants below ten times TAGM #4046 in place. Therefore, this alternative would not result full in compliance with SCGs. The cap would protect groundwater from impacts from soils above the groundwater table.

Alternative 4 would consist of complete excavation of soils with contamination above the soil cleanup objectives in TAGM #4046. Therefore, this alternative would result in full compliance with SCGs.

2. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

Except for impacts remediated at the adjacent property, no further contamination associated with the site has been detected in off-site soils. Groundwater has not been impacted. Therefore, environmental impacts and potential exposure to contaminants are limited to on-site. Also, public drinking water is provided to this area by the City of Poughkeepsie.

Presently the site is fenced and the building acts as a cap over the heaviest contamination which serves to diminish risks to the environment and human health, except to trespassers. However, there is no assurance that disruption of the site would not occur in the future. Therefore, Alternative 1 cannot be considered protective of human health or the environment. Alternatives 2, 3, and 4 seek to more aggressively mitigate contamination found on the site and thus limit their potential future impact on human health and the environment.

Alternative 2 would include installation of a hydraulic barrier system to prevent migration of groundwater through impacted soil above the existing water table. A drainage system would be installed to redirect storm water that infiltrates the asphalt paving toward the City's combined sewer. The highest potential risk to human health would be exposure to impacted soils and groundwater. These risk pathways would be addressed in this alternative by installation of an asphalt cap over the entire site and redirection of storm water. This alternative would prevent exposure and contain the contaminants on-site. Therefore, Alternative 2 would be protective of human health and the environment. Any future excavations at the site would present the potential for exposure to contaminated soils. Deed restrictions and other institutional controls would be required to inform future site owners of the contamination and the potential for exposure.

Alternative 3 would include the excavation of impacted soils with metals contaminants in concentrations above ten times the TAGM #4046 soil objectives. This alternative differs from Alternative 2 by protecting against deterioration of the groundwater quality through partial source removal along with installation of an asphalt cover. The highest potential risk to human health is exposure to soils and groundwater that has come into contact with impacted soil. These risk pathways would be addressed in this alternative by installation of asphalt paving over the entire site. Deed restrictions and other institutional controls would be required to inform future site owners of the contamination and the potential for exposure.

Alternative 4 differs from the limited excavation alternative by removing all impacted soils with contaminant concentrations above the TAGM #4046 soil cleanup objectives. Approximately 1,250 tons of contaminated soil would be removed from the site. This alternative would provide protection against degradation of the groundwater through complete source removal. The complete removal of contamination at the site would eliminate the potential for impacts to human health or the environment in the future. Alternative 4 would be the most protective of human health and the environment. Alternative 4 would clean the site to residential standards. No institutional controls would be required for the property.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

Once the building is demolished, excavation or waste containment can occur rapidly. Through excavation and/or containment, Alternatives 2, 3, and 4 would offer immediate mitigation of the on-site contamination, and thus some measure of short-term effectiveness. Alternatives 2, 3, and 4 would all have some short-term impacts on the neighborhood, such as truck traffic and noise for approximately 6 months. Alternative 1 provides no additional short-term impacts.

During any active remedial measure, such as Alternatives 2, 3, or 4 which entail demolition and excavation, a community health and safety plan (HASP) would be implemented. The community HASP would prevent short-term impacts to public health by restricting site access and conducting community air monitoring.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the controls intended to limit the risk, and 3) the reliability of these controls.

Groundwater at the site currently meets the groundwater quality standards published in 6 NYCRR, Part 700 – 706. However, Alternatives 1, 2, and 3 would leave some or all contamination in place and potential future impacts to groundwater would remain.

Alternative 1 would not provide any long term effectiveness or permanence. Metals, the contaminants at the site, are immobile in soils and would not decrease in volume or toxicity through natural processes. The contamination would therefore remain a potential hazard indefinitely. Without any remediation, any future activities at the site could result in exposures to human health and the environment. A deed restriction would be required on the property to restrict against future excavation at the site.

Under Alternative 2, more than half of the on-site contamination would remain in place. The asphalt cover and drainage system would restrict infiltration of rainwater and prevent exposures to public health and the environment. Metals are immobile in soils and would not decrease in volume or toxicity through natural processes. The contamination would remain a potential hazard indefinitely. The potential lateral migration of metals contaminants in soils below the water table in the area beneath the eastern half of the building would not be addressed. The asphalt cap would require periodic maintenance as long as the contaminants pose a threat. This alternative would not be considered to include permanent remediation. A deed restriction would be required on the property to restrict against future excavation at the site.

Approximately 550 tons of significantly contaminated soil would be removed and an asphalt cap would be constructed over the site under Alternative 3. Removal of the worst of the contamination would significantly reduce the volume of contamination. This alternative would therefore provide better long-term effectiveness and a more permanent solution than Alternatives 1 and 2. Lateral migration of metals contaminants in soils below the water table in the area beneath the eastern half of the building would not be addressed. The asphalt cap would require periodic maintenance. A deed restriction would be required on the property to restrict against future excavation at the site.

Under Alternative 4, all soil with metals contaminants above the TAGM #4046 soil cleanup objectives would be removed. The potential for groundwater impacts from soil contamination would be eliminated. Therefore, this alternative can be considered to include permanent remediation and would provide long-term effectiveness.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

The no further action alternative would not reduce contaminant volume, toxicity or mobility and would not provide protection to the overburden or bedrock groundwater beneath the site.

Under Alternative 2, partial removal of metals from the site by excavation of the upper two feet of soil east of the building and underneath the eastern half of the building would reduce a relatively small amount of the contaminant volume relative to the site. Capping of the soil underneath the eastern half of the building would reduce vertical migration of the contaminants, however, horizontal migration of contaminants at or below the water table would not be addressed. This alternative does not provide any type of treatment to reduce toxicity of the remaining contaminants.

Alternative 3 would remove the significantly impacted soils, thereby reducing the volume of metals at the site. The asphalt cover would provide some containment to reduce mobility of contaminants in soils above the water table. This alternative would not provide any type of treatment to reduce toxicity of the remaining contaminants.

All of the contaminated soils would be removed in Alternative 4. Complete excavation and off-site disposal of the contaminated soils would significantly reduce the volume and mobility of metals at the site.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction and the ability to monitor the effectiveness of the remedy. For administrative feasibility, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.

Alternative 1 would be the simplest to implement because no action would be conducted. Alternatives 2, 3, and 4 would require pre-remediation building demolition and ACM mitigation. All of the remedial actions presented would be easily implementable with standard demolition and construction techniques. The various actions proposed under all of the alternatives are technically and administratively feasible and the services are available. Alternative 2 would be the most difficult to implement since a more detailed remedial design would be necessary for hydraulic control and capping. Alternatives 3 and 4 would require some simple remedial design. Alternative 3 would consist of excavation and paving. Alternative 4 would require more extensive excavation, more than twice the volume proposed for Alternative 3, and backfill.

7. Cost. Capital and operation and maintenance costs are estimated for each alternative and compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision. The costs for each alternative are presented in Table 2.

This final criterion is considered a modifying criterion and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. **Community Acceptance** - Concerns of the community regarding the SI/RAR reports and the Proposed Remedial Action Plan have been evaluated. The "Responsiveness Summary" included as Appendix A presents the public comments received and the Department's response to the concerns raised.

The public strongly supported the Departments's proposed remedy for this site.

SECTION 8: SUMMARY OF THE SELECTED REMEDY

Based upon the results of the SI/RAR, and the evaluation presented in Section 7, the NYSDEC is selecting Alternative 4, complete removal of contaminated soils above TAGM #4046 objectives, with backfilling, as the remedy for this site.

This selection is based upon the protection of human health and the environment that will be achieved. Alternative 4 will be easy to implement, will remove contaminants from the site, and provide the highest level of protection to human health and the environment. This alternative will be the most effective in the long-term and will provide complete compliance with SCGs. Complete excavation will immediately reduce

the volume, remove toxic materials from the site, and prevent migration of contaminants. Alternative 4 will bring the site to a cleanup level consistent with residential standards. This is consistent with the proposed future use of the site.

The estimated present worth cost to implement the remedy is $262,000. Because all contamination will be removed by the selected remedy, no operation and maintenance or long term sampling costs will be incurred. The total cost to construct the remedy is the estimated to be $262,000.

The elements of the selected remedy are as follows:

1. A remedial design program to verify the components of the conceptual design and provide the details necessary for the implementation of the remedial program. Any uncertainties identified during the SI/RAR will be resolved with delineation sampling prior to excavation.

2. Asbestos abatement will be conducted in the structure, salvageable materials will be separated from the structures for recycling, and the building will be demolished.

3. This alternative will incorporate complete removal of soils with contaminant levels above TAGM #4046 soil cleanup objectives. To accomplish complete removal, approximately one to two feet of soil east of the existing building will be removed in addition to approximately twelve feet of soil under the eastern half of the existing building. Approximately 1,250 tons of soil will be removed from the site.

4. In order to verify complete removal of soils with contaminant levels above TAGM #4046 soil cleanup objectives, delineation sampling will be required. A grid will be established and soil samples will be collected at various intervals based on previous investigations to define the limits of excavation.

5. All excavated material and demolition wastes will be properly disposed of at appropriately permitted landfills.

6. Following complete removal of soils with contaminant levels above TAGM #4046 soil cleanup objectives, the site will be rough graded and backfilled to achieve acceptable grades. The site will then be covered with topsoil and seeded.

SECTION 9: HIGHLIGHTS OF COMMUNITY PARTICIPATION

As part of the Qual Krom environmental restoration process, a number of Citizen Participation (CP) activities were undertaken in an effort to inform and educate the public about conditions at the site and the potential remedial alternatives. The following public participation activities were conducted for the site:

- Repositories for documents pertaining to the site were established.

- A site mailing list was established which included nearby property owners, local political officials local media and other interested parties.

- A public notice announcing a public meeting and a fact sheet summarizing the Site Investigation / Remedial Alternatives work plan were mailed.

- A public meeting was held on May 13, 1998 at the Poughkeepsie City Hall to present the Site Investigation / Remedial Alternatives Work Plan.

- By request, the NYSDEC, the NYSDOH and the City's consultant met with the Taylor Avenue Residents Association to address public health concerns and the investigation and remediation schedules.

- A public notice announcing a public meeting and a fact sheet were mailed to citizens, officials and organizations on the mailing list on February 9, 1999.

- A public meeting was held on March 8, 1999 at the Poughkeepsie City Hall to present the findings of the Site Investigation / Remedial Alternatives Report and the Proposed Remedial Action Plan.

- In March 1999 a Responsiveness Summary was prepared and made available to the public, to address the comments received during the public comment period for the PRAP.

Table 1
Nature and Extent of Contamination

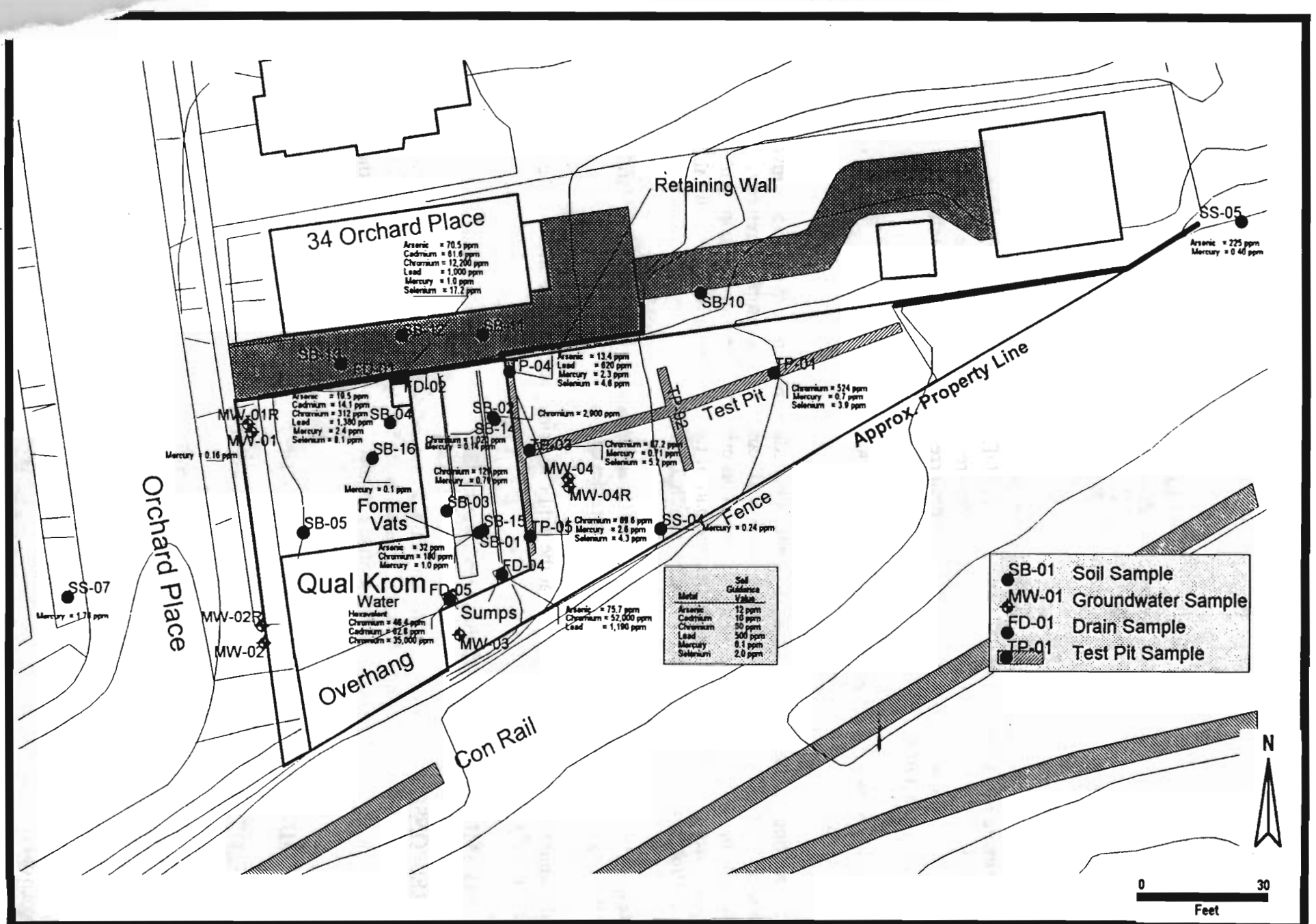
MEDIA	CLASS	CONTAMINANT OF CONCERN	CONCENTRATION RANGE (ppb)	FREQUENCY of EXCEEDING SCGs	SCG (ppb)
Soils	Inorganic Compounds	Arsenic	ND - 225,000	22/46	7,500
		Chromium	ND - 2,900,000	13/46	50,000
		Lead	ND - 1,250,000	2/46	500,000
		Mercury	ND - 2,600	13/46	100
		Selenium	ND - 5,200	4/46	2,000
Floor Drain Sediments	Inorganic Compounds	Arsenic	19,500 - 75,700	3/3	7,500
		Chromium	312,000 - 52,200,000	3/3	50,000
		Lead	1,000,000 - 1,380,000	3/3	500,000
		Mercury	120 - 2,400	3/3	100
		Selenium	ND - 17,200	2/3	2,000
		Silver	3,300 - 16,000		NA
Floor Drain Surface Water	Inorganic Compounds	Cadmium	62.8	1/1	5
		Chromium	35,000	1/1	50
		Lead	122	1/1	25
Groundwater	Inorganic Compounds	Iron	691 - 45,400	6/6	500
		Lead	ND-26.1	1/6	25
		Manganese	115 - 849	3/6	500
		Sodium	12,700 - 59,400	4/6	20,000
Groundwater	Volatile Organic Compounds (VOCs)	ND			
Groundwater	Semivolatile Organic Compounds (SVOCs)	ND			
Groundwater	PCBs	ND			

Table 2
Remedial Alternative Costs

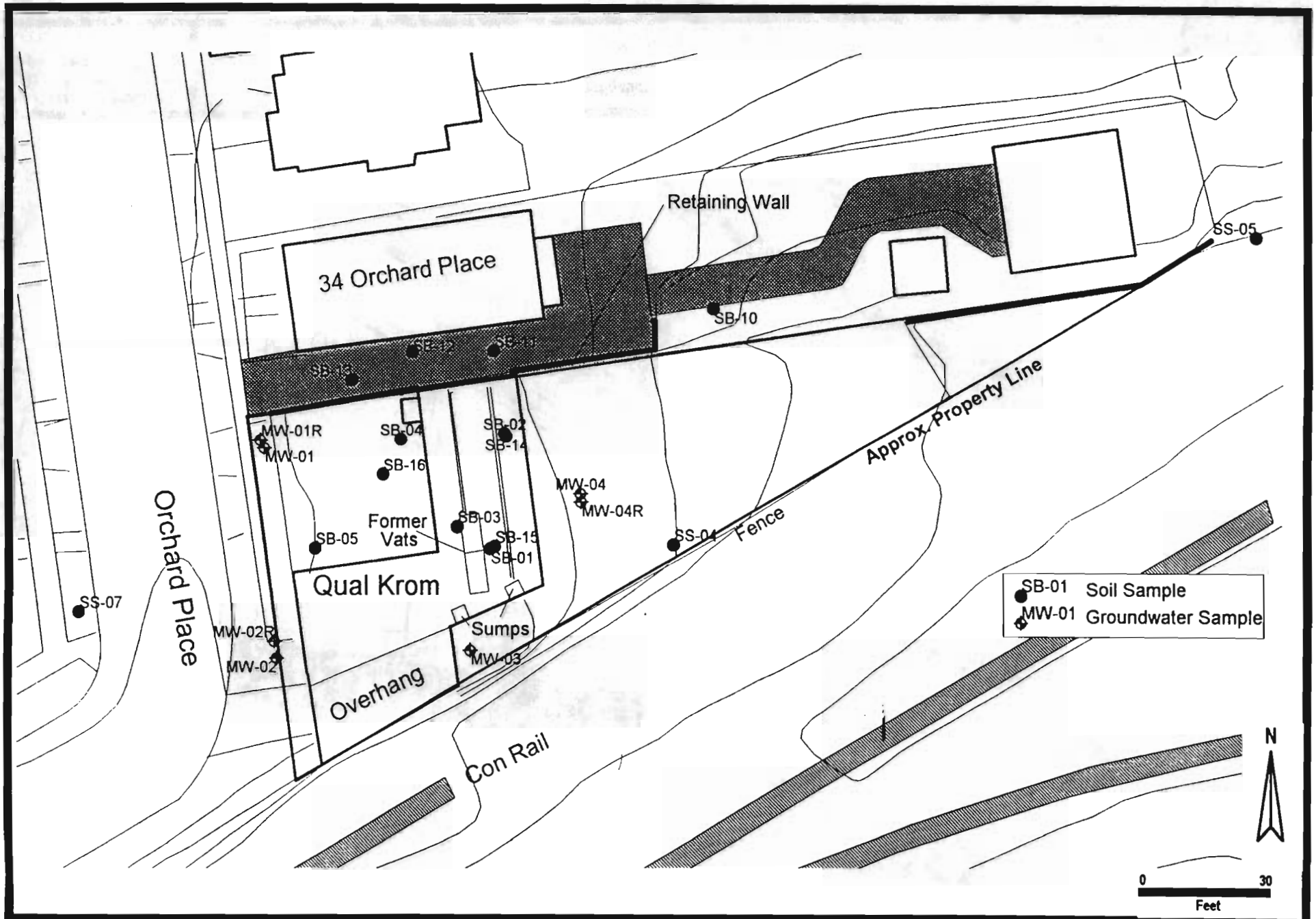
Remedial Alternative	Capital Cost	Annual O&M	Total Present Worth
1. No Further Action	$0	$0	$0
2. Multimedia Asphalt Cap	$227,000	$6,000	$254,000
3. Limited Excavation with Cover	$208,000	$1,500	$215,000
4. Complete Removal with Backfill	$262,000	$0	$262,000

Notes:

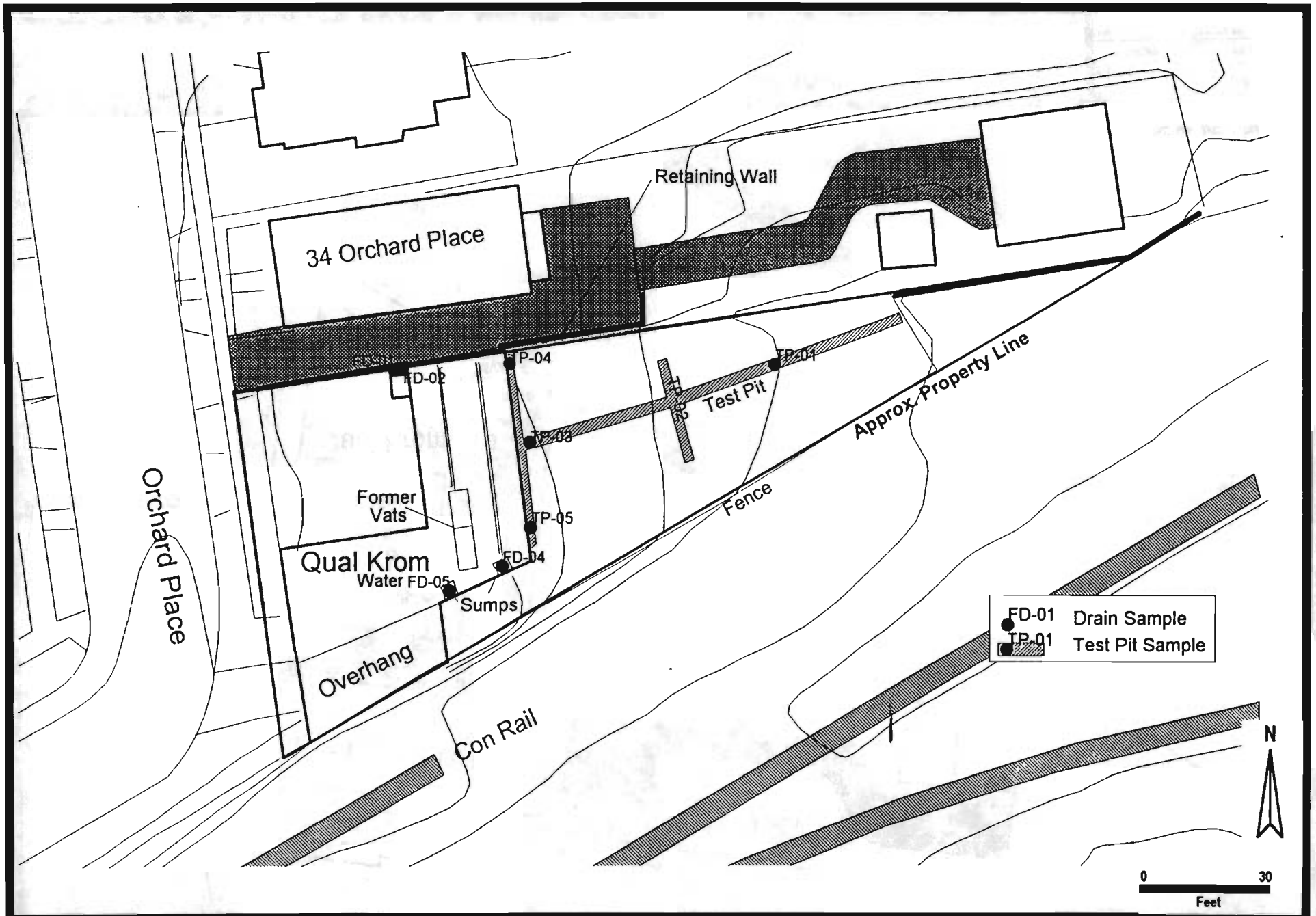
- Alternative 2 and 3 would require short-term groundwater monitoring.
- Alternatives 2, 3, and 4 include $125,000 for cost of asbestos abatement and building demolition.
- Total present worth is calculated assuming a 5% interest rate.



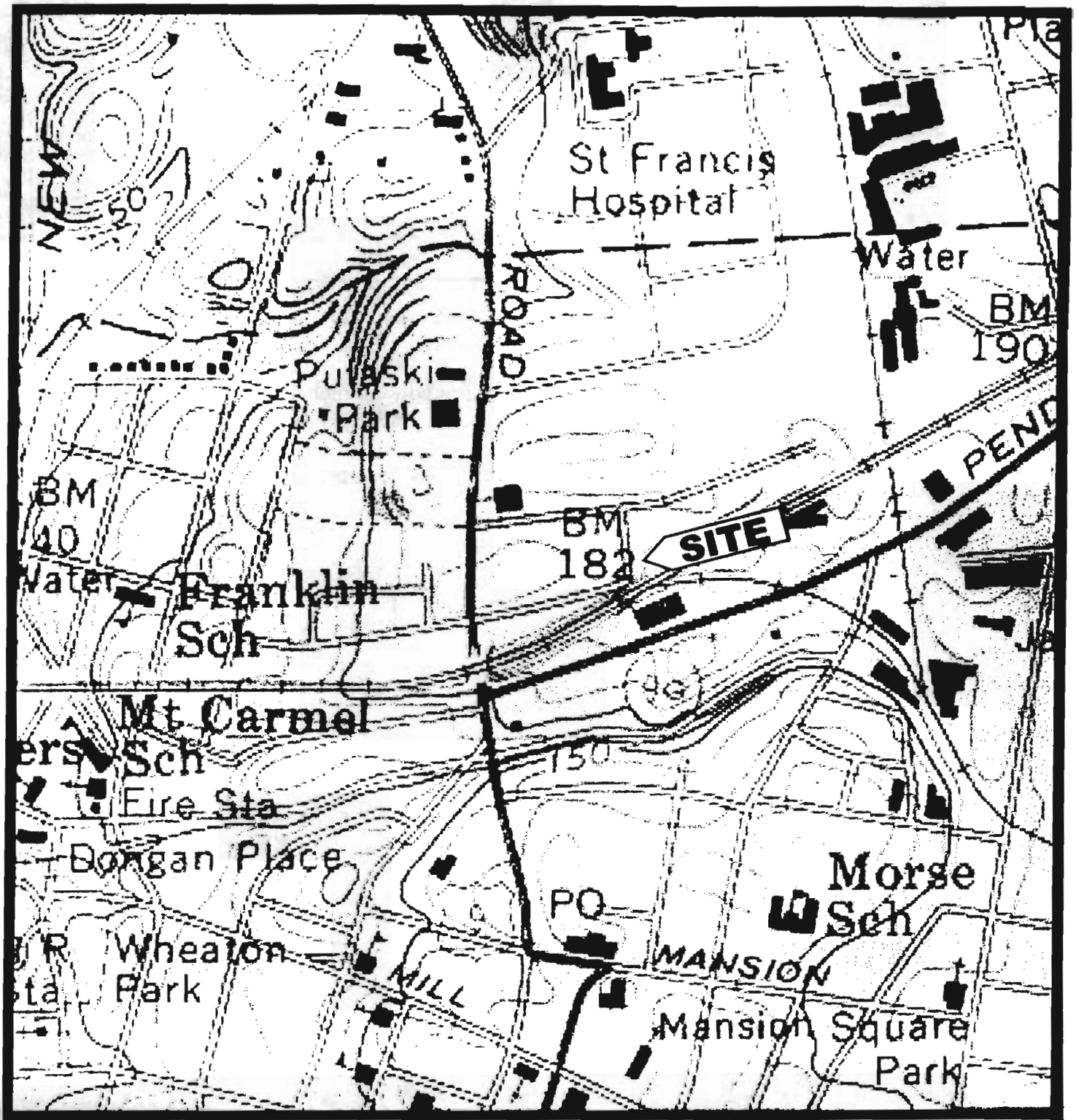
The Chazen Companies 229B Page Park, Manchester Road Poughkeepsie, NY 12603	TITLE: **Metals in Soil at Levels Above TAGM #4046**	DRAWING:	SITE NAME: Qual Krom
		DATE: 01/29/99	PROJECT NO: 49055.01
		CHKD: / APPD:	FIGURE NO: 4



The Chazen Companies 229B Page Park, Manchester Road Poughkeepsie, NY 12603	TITLE: **Site Investigation/Remedial Alternatives Sampling Points**	DRAWING:	SITE NAME: Qual Krom
		DATE: 01/29/99	PROJECT NO: 49055.01
		CHKD: APPD:	FIGURE NO: 3



The Chazen Companies 229B Page Park, Manchester Road Poughkeepsie, NY 12603	TITLE: **Previous Investigation Sampling Points**	DRAWING:	SITE NAME: Qual Krom
		DATE: 01/29/99	PROJECT NO: 49055.01
		CHKD: APPD:	FIGURE NO: 2



	Source USGS Quadrangle; Poughkeepsie	**Figure 1**
	Scale in Feet Scale not available	**Site Location Map**
North May, 1998	THE Chazen COMPANIES	**Qual Krom Site** **Orchard Place** **Poughkeepsie, New York**

APPENDIX A
Responsiveness Summary

Qual Krom
Environmental Restoration Proposed Remedial Action Plan
Poughkeepsie(C),Dutchess County
Site No. B00036-3

The Proposed Remedial Action Plan (PRAP) for the Qual Krom Site, was prepared by the New York State Department of Environmental Conservation (NYSDEC) and issued to the local document repository on February 9, 1999. This Plan outlined the preferred remedial measure proposed for the remediation of the contaminated soil at the Qual Krom Site. The preferred remedy is complete removal of soils contaminated above TAGM #4046 soil cleanup objectives.

The release of the PRAP was announced via a notice to the mailing list, informing the public of the PRAP's availability.

A public meeting was held on March 8, 1999 which included a presentation of the Site Investigation (SI) and Remedial Alternatives Report (RAR) as well as a discussion of the proposed remedy. The meeting provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. These comments have become part of the Administrative Record for this site. The public comment period for the PRAP ended on March 26, 1999.

This Responsiveness Summary responds to all questions and comments raised at the March 8, 1999 public meeting. There were no written comments recieved.

The following are the comments received at the public meeting, with the NYSDEC's, the NYSDOH's and the City of Poughkeepsie's responses:

COMMENT 1: How much has been spent to date?

RESPONSE 1: For the Site Investigation, Remedial Alternatives Report and the Interim Remedial Measure conducted at the adjacent property, $160,000 has been spent. New York State provided 75% of the funding through the Brownfield grant program.

COMMENT 2: When will remediation of the site be completed?

RESPONSE 2: The remedial action is expected to be completed by the end of October 1999.

COMMENT 3: Alternative 4 is the most favorable remedial action for us residents.

RESPONSE 3: The State agrees.

COMMENT 4: Is there any chance that the application for remediation will be denied?

RESPONSE 4: It is unlikely that the remedial application will be denied.

COMMENT 5: Will fire hoses be used to control dust during demolition and excavation?

RESPONSE 5: Yes. With proper application, applying water to the demolition and excavation activities is the most effective method to control dust and prevent public exposure to contaminated dust.

COMMENT 6: Can the City and the NYSDEC guarantee remediation of the site will be completed by October 1999?

RESPONSE 6: Both the City and the State have set October 1999 as the goal for completion. The Department is committed to moving the project along rapidly, and barring any unforseen problems, the October 1999 goal will be met.

APPENDIX B
Administrative Record

Qual Krom
Environmental Restoration Proposed Remedial Action Plan
Poughkeepsie(C),Dutchess County
Site No. B00036-3

A. Reports

1. United States Environmental Protection Agency Fact Sheet, USEPA, April 8, 1996.

2. Site Investigation Work Plan, Qual Krom Site, 28 Orchard Street, Poughkeepsie, New York, The Chazen Companies, May 1997.

3. Site Investigation / Remedial Alternatives (SI/RA) Work Plan, Qual Krom, Poughkeepsie, New York, The Chazen Companies, April 17, 1998.

4. Appendix A, SI/RA Work Plan, Sampling and Analysis Plan, Qual Krom, Poughkeepsie, New York, The Chazen Companies, April 17, 1998.

5. Appendix B, SI/RA Work Plan, Health and Safety Plan, Qual Krom, Poughkeepsie, New York, The Chazen Companies, April 17, 1998.

6. Citizen Participation Plan, Qual Krom, Poughkeepsie, New York, The Chazen Companies, April 17, 1998.

7. Interim Remedial Measures Work Plan, Qual Krom Facility, Brownfield Project #B00036-3, Orchard Place, Poughkeepsie, New York, The Chazen Companies, August, 1998.

8. Interim Remedial Measures Report, Qual Krom Facility, Brownfield Project #B00036-3, 34 Orchard Place, Poughkeepsie, New York, The Chazen Companies, October, 1998.

9. Site Investigation / Remedial Alternatives, Qual Krom Site, Brownfield Project #B00036-3, Orchard Place, Poughkeepsie, New York, The Chazen Companies, January, 1999.

10. Site Investigation / Remedial Alternatives, Appendix Volume I - Appendix C-F, Qual Krom Site, Brownfield Project #B00036-3, Orchard Place, Poughkeepsie, New York, The Chazen Companies, January, 1999.

B. Legal Instruments

1. State Assistance Contract No. C300722, March 1998.

2. State Assistance Contract No. C300722 Amendment #1, March 1999.

C. Correspondence

1. Letter to Carol Sondheimer, Development Director, City of Poughkeepsie from Susan McCormick, P.E., NYSDEC dated July 13, 1998.

2. Letter to Geoff Laccetti, Public Health Specialist, NYSDOH from Clement Parkinson, Council Member - 3rd Ward, City of Poughkeepsie dated August 10, 1998.

3. Letter to Carol Sondheimer, Development Director, City of Poughkeepsie from Susan McCormick, P.E., NYSDEC dated August 14, 1998.

4. Work plan addendum letter to Michael MacCabe, Environmental Engineer, NYSDEC from Greg Bolner, Environmental Engineer, The Chazen Companies dated August 18, 1998.

5. Letter to Mr. & Mrs. Thomas Szelowski from Susan D. McCormick, P.E., NYSDEC dated August 18, 1998

6. Letter to Michael J. O'Toole, Jr., Director, Division of Environmental Remediation, NYSDEC, from G. Anders Carlson, Director, Bureau of Environmental Exposure Investigation, NYSDOH dated February 5, 1999.

7. Memorandum to Erin Crotty, Deputy Commissioner, NYSDEC from Michael J. O'Toole, Jr., Director, Division of Environmental Remediation dated February 5, 1999.